(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

[Continued on next page]

(54) Title: SYSTEM FOR REMOTELY MANAGING NETWORK THROUGH SERIAL PORTS
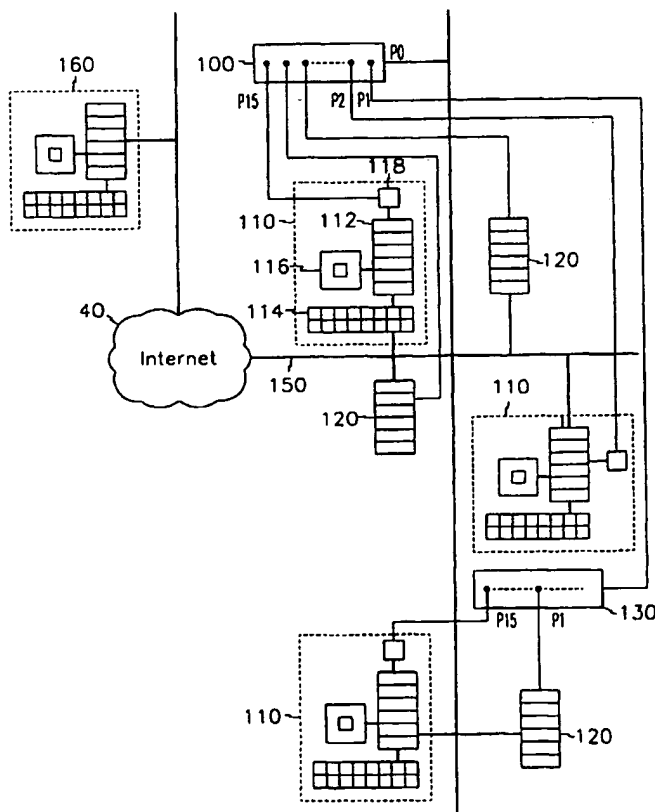
(57) Abstract: Disclosed is a system for remotely managing a network through serial ports. The system comprises managed systems (110, 120) including a keyboard port and a monitor port, and a serial port having at least a transmission terminal and a reception terminal, the keyboard port and the monitor port having a higher priority than the serial port; a LAN (150) for enabling access to the managed systems (110, 120); a host box (100) including a switch realized through a single movable contact point connected to the LAN (150) and a plurality of fixed contact points connected to the managed systems; a keybox (118) interposed between the managed systems (110, 120) and the host box (100), the keybox (118) selectively outputting signals transmitted from the host box (100) to the output terminal of the keyboard port of the managed systems and to the serial port of the managed systems in accordance with the connection of a keyboard (114) and a monitor (116) respectively to the keyboard port and the monitor port; and a remote management server (160) connected to the LAN (150) via the Internet (40), the remote management server (160) performing the management of the managed systems through the host box (100).

WO 01/93508 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SYSTEM FOR REMOTELY MANAGING NETWORK
THROUGH SERIAL PORTS

BACKGROUND OF THE INVENTION

(a) Field of the Invention

5   The present invention relates to a network management system, and

more particularly, to a system for remotely managing a network through

serial ports in which a network can be managed from a remote management

server even in a state where a keyboard and monitor are connected to a

managed system.

10 **(b)   Description of the Related Art**

A network management system (NMS) performs a variety of tasks so

that a network operates smoothly. They include ensuring that the network is

protected from unauthorized users, eliminating bottlenecks in the network,

and making sure the network is available to users and responding to

15 hardware and software malfunctions.

FIG. 1 shows a schematic view illustrating a complete network

configuration of a prior art system for remotely managing a network using

serial ports. The drawing is reproduced from Aurora Technology's website in

which their Control Tower™ Console Management System is described.

20   As shown in the drawing, the remote management system includes

two main elements, that is, a management server 30 and a plurality of

managed systems 10 connected to the management server 30. The

management server 30 has as hardware a multiport console interface 36. As

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software, the management server 30 has (a) a host program module 32 that controls and monitors the managed systems and (b) a viewer program module 34 that enables access to the host program module 32 from a remote control server 50 via a TCP/IF (transfer control protocol/Internet

5   protocol), that is, the Internet 40.

The multiport console interface 36 is connected to a serial port of each managed system 10 via, for example, a RS-232C interface. The management server 30 further includes a keyboard 37 and a monitor 38 also for controlling and monitoring the managed systems 10. The managed

10 systems 10 can be various servers of Internet sites, and the functions that can be performed include the rebooting of the managed systems 10, log file monitoring, key input, and the running of various diagnoses.

In most computers using a Sun Solaris or UNIX system as an operating system, a higher priority is given to a keyboard port or monitor port

15 than to a serial port connecting a modem or line printer. For the Control Tower™ Console Management System, an operator program is managed when a keyboard and monitor are not connected to each managed system.

However, there are various instances when an operator needs to directly operate the managed systems, and with the prior art systems, this is

20 not possible. That is, if a keyboard and monitor are connected to the managed systems to allow such direct operation, network management at a management server or a remote control server with respect to the managed systems is not possible since the monitor and keyboard have a higher priority.

SUMMARY OF THE INVENTION

The present invention has been made in an effort to solve the above problems.

It is an object of the present invention to provide a system for remotely managing a network through serial ports in which a network can be managed from a remote management server even in a state where a keyboard and monitor are connected to a managed system.

To achieve the above object, the present invention provides a system for remotely managing a network through serial ports comprising managed systems including a keyboard port and a monitor port, and a serial port having at least a transmission terminal and a reception terminal, the keyboard port and the monitor port having a higher priority than the serial port; a LAN for enabling access to the managed systems; a host box including a switch realized through a single movable contact point connected to the LAN and a plurality of fixed contact points connected to the managed systems; a keybox interposed between the managed systems and the host box, the keybox selectively outputting signals transmitted from the host box to the output terminal of the keyboard port of the managed systems and to the serial port of the managed systems in accordance with the connection of a keyboard and a monitor respectively to the keyboard port and the monitor port; and a remote management server connected to the LAN via the Internet, the remote management server performing the management of the managed systems through the host box.

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BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention, and, together with the description, serve to explain the principles

5 of the invention:

FIG. 1 is a schematic view illustrating a complete network configuration of a prior art system for remotely managing a network using serial ports;

FIG. 2 is a schematic view illustrating a complete network

10 configuration of a system for remotely managing a network using serial ports according to a preferred embodiment of the present invention;

FIG. 3 is an internal schematic view of host box of FIG. 2; and

FIG. 4 is an internal schematic view of a keybox of FIG. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 Preferred embodiments of the present invention will now be described in detail with reference to the accompanying drawings.

FIG. 2 shows a schematic view illustrating a complete network configuration of a system for remotely managing a network using serial ports according to a preferred embodiment of the present invention.

20 As shown in the drawing, the network configuration of the system of the present invention includes a serial controller (hereinafter referred to as a "host box") 100 acting as a host and having a plurality of connection ports P0 – P15; managed systems 110 and 120 connected to the ports P1 – P15

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of the host box 100; a LAN 150 connecting each managed system 100 and

120 for enabling remote access to the managed systems 100 and 120; and a

remote management server 160 remotely connected to the managed

systems 110 and 120 via the LAN 150 and the Internet 40.

5   The LAN 150 is connected to one of the plurality of ports P0 – P15 of

the host box 100. In the present invention, though not limited to this

configuration, the LAN 150 is connected to the port P0. Further, it is possible

for the managed systems 110 and 120 to both be equipped with a keyboard

and monitor or include only a main body with no keyboard and monitor

10   connected thereto. In the present invention, a keyboard 114 and a monitor

116 are connected to the managed systems 110, while the managed

systems 120 are comprised of only a main body. A means (hereinafter

referred to as a keybox) 118, for either transmitting signals received from the

host box 100 to an output terminal or a serial port of the keyboard 114

15   connected to the main body 112, is connected to the main body 112 of the

managed systems 110.

In the above configuration, since an IP address is assigned to the

host box 100, control is able to be performed in the remote management

server 160 as long as the LAN 160 is not malfunctioning.

20   Reference numeral 130 in FIG. 2 refers to an extension host box.

The extension host box 130 is additionally provided in the case where, for

example, there are more than 15 managed systems 110 and 120. With the

addition of the extension host box 130, a maximum of 127 managed systems

110 and 120 can be connected to the system. Also, it is possible for the

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remote management server 160 of FIG. 2 to be a network management

agency.

FIG. 3 is an internal schematic view of the host box 100. The

elements of the host box 100 appearing in FIG. 3 are also applicable to the

5   extension host box 130. As shown in the drawing, the host box 100 includes

a plurality of ports P0 – P16 and a single switch 102. The port P0, which is

connected to the LAN 150, is connected to a movable contact point of the

switch 102, and the remaining ports P1 – P15 are connected to fixed contact

points of the switch 102. The switch 102 can be either a hardware switch or

10 a software switch.

FIG. 4 shows an internal schematic view of the keybox 118. As

shown in the drawing, the keybox 118 includes a switch 118a and an OR

gate 118b. The serial ports P0 – P15 connected to the managed systems

110 and 120 include a transmission terminal Tx and reception terminal Rx on

15 the basis of the managed systems 110 and 120. In the case of the

transmission terminal Tx, connection to the transmission terminal Tx of the

host box 100 is realized by passing through the keybox 118.

The switch 118a includes a single movable contact point connected

to the reception terminal Rx of the host box 100 and two fixed contact points

20 connected to the reception terminals Rx of the managed systems 110 and

one input terminal of the OR gate 118b. A key input terminal of the keyboard

114 is connected to the other input terminal of the OR gate 118b, and an

output terminal of the OR gate 118b is connected to the key output terminal

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of the keyboard 114.

In the above configuration, the OR gate 118b receives signals of the keyboard 114 and reception terminal Rx signals of the serial ports, and transmits the signals to the keyboard ports of the managed systems 110. In

5 the case where the keyboard 114 and monitor 116 are connected to the managed systems 110, commands of the remote management server 160 pass through, in sequence, a corresponding port of the host box 100, and the switch 118a and the OR gate 118b of the keybox 118. The commands are then automatically sent to the key output terminal of the keyboard 114 of

10 the managed system 110 such that the conventional problem of priority is solved. Of course, since signals of the key input terminal of the keyboard 114 are also sent to the key output terminal of the keyboard 114 of the managed system 110, required key input operations are able to be performed through the managed system 110.

15 In the case of the managed system 120 to which a keyboard and monitor are not connected, signals from the remote management server 160 are transmitted through a serial port of the managed system 120 by a keybox member as in the prior art.

In the above structure, the switch 118a is realized through a TTL

20 (transistor transistor logic) logic gate such that setting can be performed by a systems administrator of a network management agency when the network management system is set up.

In the system for remotely managing a network through serial ports of the present invention as described above, since network management of

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managed systems is possible even in a state where a keyboard and monitor are connected to the managed systems, key input required by the managed systems is able to be performed. Accordingly, an increased scope of application is realized with the present invention when compared to prior art

5   systems.

Although preferred embodiments of the present invention have been described in detail hereinabove, it should be clearly understood that many variations and/or modifications of the basic inventive concepts herein taught which may appear to those skilled in the present art will still fall within the

10   spirit and scope of the present invention, as defined in the appended claims.

For example, the present invention can be utilized with various operating systems such as the Sun Solaris operating system, Hewlett-Packard's operating system, IBM's OS/2 operating system, and Microsoft's NT server.

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WHAT IS CLAIMED IS:

1. A system for remotely managing a network through serial ports comprising:

managed systems including a keyboard port and a monitor port, and

5   a serial port having at least a transmission terminal and a reception terminal,

the keyboard port and the monitor port having a higher priority than the serial

port;

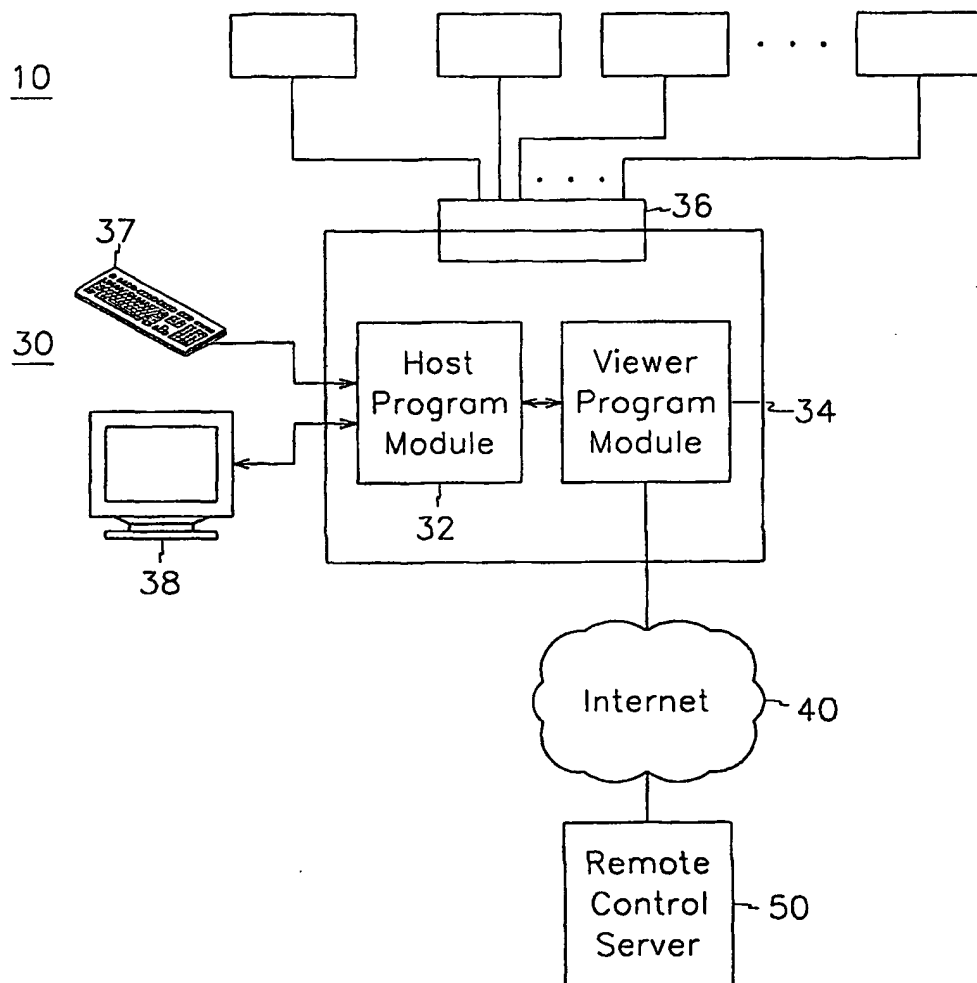a LAN for enabling access to the managed systems;

a host box including a switch realized through a single movable

10   contact point connected to the LAN and a plurality of fixed contact points

connected to the managed systems;

a keybox interposed between the managed systems and the host

box, the keybox selectively outputting signals transmitted from the host box

to the output terminal of the keyboard port of the managed systems and to

15   the serial port of the managed systems in accordance with the connection of

a keyboard and a monitor respectively to the keyboard port and the monitor

port; and

a remote management server connected to the LAN via the Internet,

the remote management server performing the management of the managed
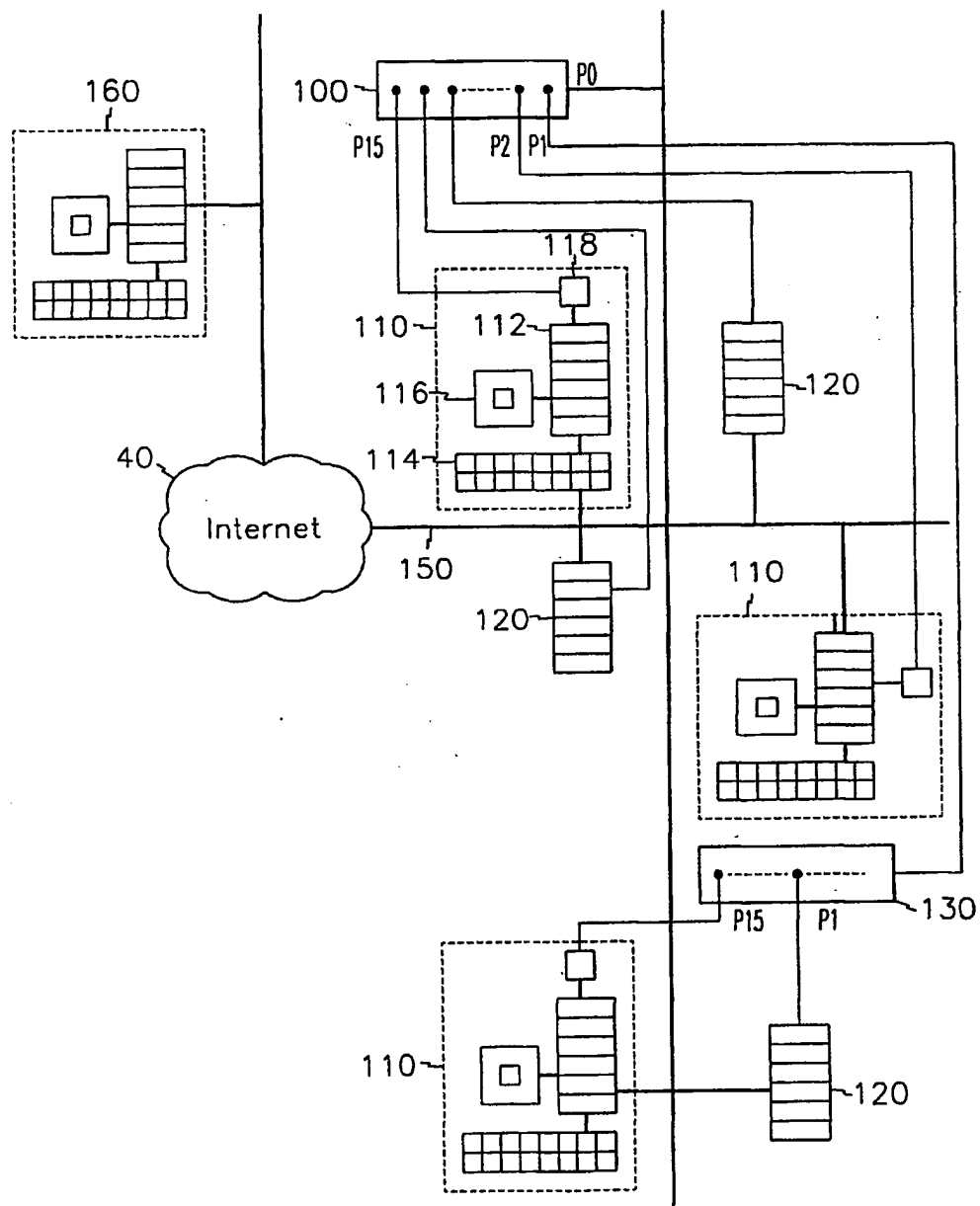
20   systems through the host box.

FIG. 1

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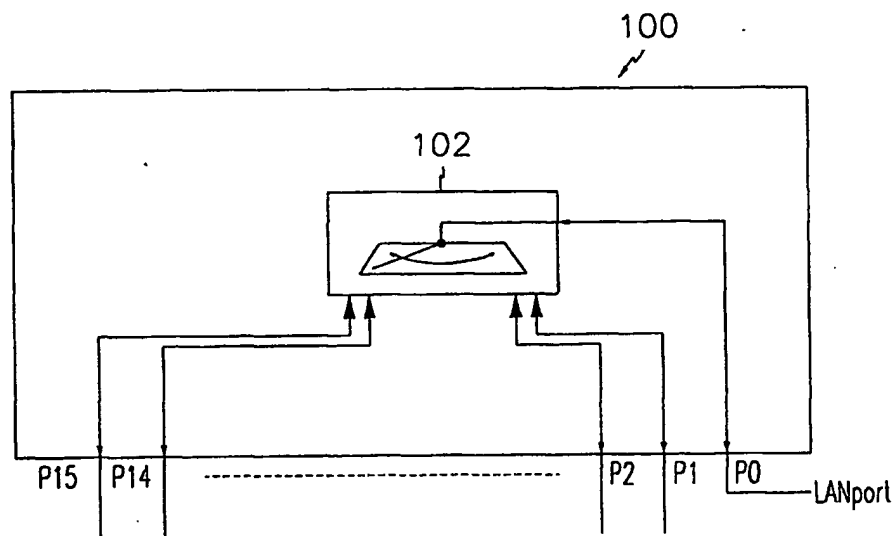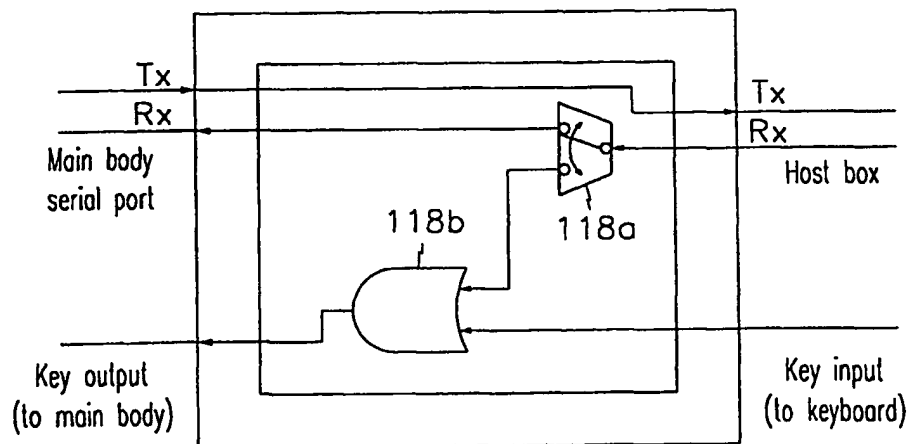Host Program Module

Viewer Program Module

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Internet ~40

Remote Control Server ~50

FIG. 2

3/3

FIG. 3

FIG. 4

118

INTERNATIONAL SEARCH REPORT

	CLASSIFICATION OF SUBJECT MATTER

IPC^7: H04L 12/28, 12/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC^7: G06F 15/16, 15/173, H04L 12/26, 12/28, 12/46, 12/66

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0812086 A2 (NIPPON TELEGRAPH & TELEPHONE CORP.) 10 December 1997 (10.12.97) . *fig.1, claim 1.*	1
A	US 5748896 A (ANN, H.Y. et al.) 5 May 1998 (05.05.98) *fig.2, claim 1.*	1

☐ Further documents are listed in the continuation of Box C.   ☒ See patent family annex.

* Special categories of cited documents:	„T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
„A" document defining the general state of the art which is not considered to be of particular relevance	
„E" earlier application or patent but published on or after the international filing date	„X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
„L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	„Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
„O" document referring to an oral disclosure, use, exhibition or other means	
„P" document published prior to the international filing date but later than the priority date claimed	„&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 June 2001 (28.06.2001)	16 August 2001 (16.08.2001)

Name and mailing adress of the ISA/AT	Authorized officer
Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna	FUSSY
Facsimile No. 1/53424/535	Telephone No. 1/53424/328

Form PCT/ISA/210 (second sheet) (July 1998)

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
EP	A2	812086	10-12-1997	JP US	A2 A	10056473 6075776	24-02-1998 13-06-2000
US	A	5748896	05-05-1998			none	